

This Page Is Inserted by IFW Operations  
and is not a part of the Official Record

## **BEST AVAILABLE IMAGES**

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

**IMAGES ARE BEST AVAILABLE COPY.**

**As rescanning documents *will not* correct images,  
please do not report the images to the  
Image Problem Mailbox.**

Requested Patent: GB2275281A

Title:

STUD PARTITION RESISTANT TO BULLETS OR BOMB BLAST ;

Abstracted Patent: GB2275281 ;

Publication Date: 1994-08-24 ;

Inventor(s):

HAMMERTON ROY WILLIAM JAMES; NORTHOVER PETER  
ARTHUR ;

Applicant(s): HAMMERTON ROY WILLIAM JAMES (GB) ;

Application Number: GB19940003377 19940222 ;

Priority Number(s): GB19930003529 19930222 ;

IPC Classification: E04B1/92; E04B2/76 ;

Equivalents: ;

ABSTRACT:

A stud partition (22) comprising first sheet material (24) forming a first side (26) of the partition (22), second sheet material (28) forming a second side (30) of the partition (22), a plurality of vertically extending stud members (32) which are positioned between the first and the second sheet material (24, 28) such that the first and the second sheet material (24, 28) are spaced apart and define therebetween a cavity (34) in the partition (22), and third sheet material (36) which is positioned in the cavity (34) and which is for resisting penetration by bullets and flying debris from bombs. The sheet (36) may be GRP held in place by C-shaped channel members (40); metal mesh sheets (46) and metal plates (48) may lie between sheets (24, 28) and the studs (32); sheets (24, 28) may be of plasterboard.

# (12) UK Patent Application (19) GB (11) 2 275 281 (13) A

(43) Date of A Publication 24.08.1994

(21) Application No 9403377.6

(22) Date of Filing 22.02.1994

(30) Priority Data

(31) 9303529

(32) 22.02.1993

(33) GB

(71) Applicant(s)

Roy William James Hammerton  
4 Meadow Drive, KEYWORTH, Notts, NG12 5EE,  
United Kingdom

(72) Inventor(s)

Roy William James Hammerton  
Peter Arthur Northover

(74) Agent and/or Address for Service

Graham Jones & Company  
77 Beaconsfield Road, Blackheath, LONDON,  
SE3 7LG, United Kingdom

(51) INT CL<sup>5</sup>

E04B 1/92 2/76

(52) UK CL (Edition M)

E1D DF115 DLCKK2 D2047 D2105 D2137 D401 D402  
D404 D414 D430

(56) Documents Cited

GB 2205336 A

(58) Field of Search

UK CL (Edition M) E1D DF115 DLCKK DLEKK  
INT CL<sup>5</sup> E04B  
ON-LINE; WPI

(54) Stud partition resistant to bullets or bomb blast

(57) A stud partition (22) comprising first sheet material (24) forming a first side (26) of the partition (22), second sheet material (28) forming a second side (30) of the partition (22), a plurality of vertically extending stud members (32) which are positioned between the first and the second sheet material (24, 28) such that the first and the second sheet material (24, 28) are spaced apart and define therebetween a cavity (34) in the partition (22), and third sheet material (36) which is positioned in the cavity (34) and which is for resisting penetration by bullets and flying debris from bombs. The sheet (36) may be GRP held in place by C-shaped channel members (40); metal mesh sheets (46) and metal plates (48) may lie between sheets (24, 28) and the studs (32); sheets (24, 28) may be of plasterboard.

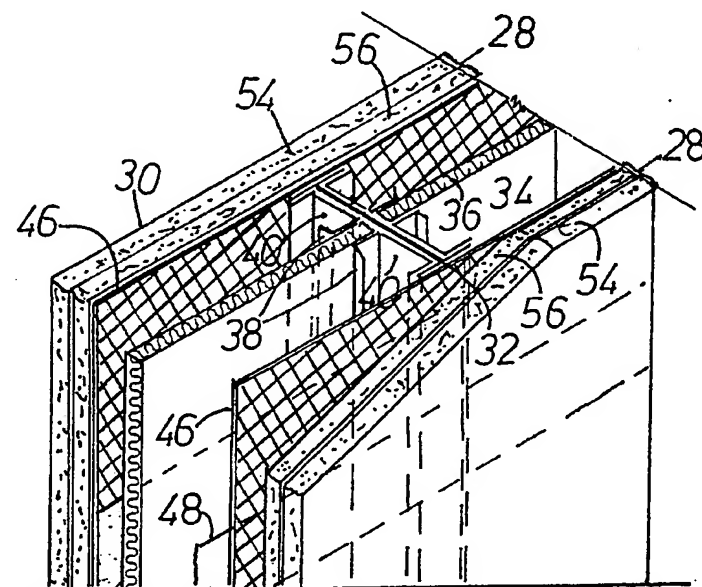


FIG 4

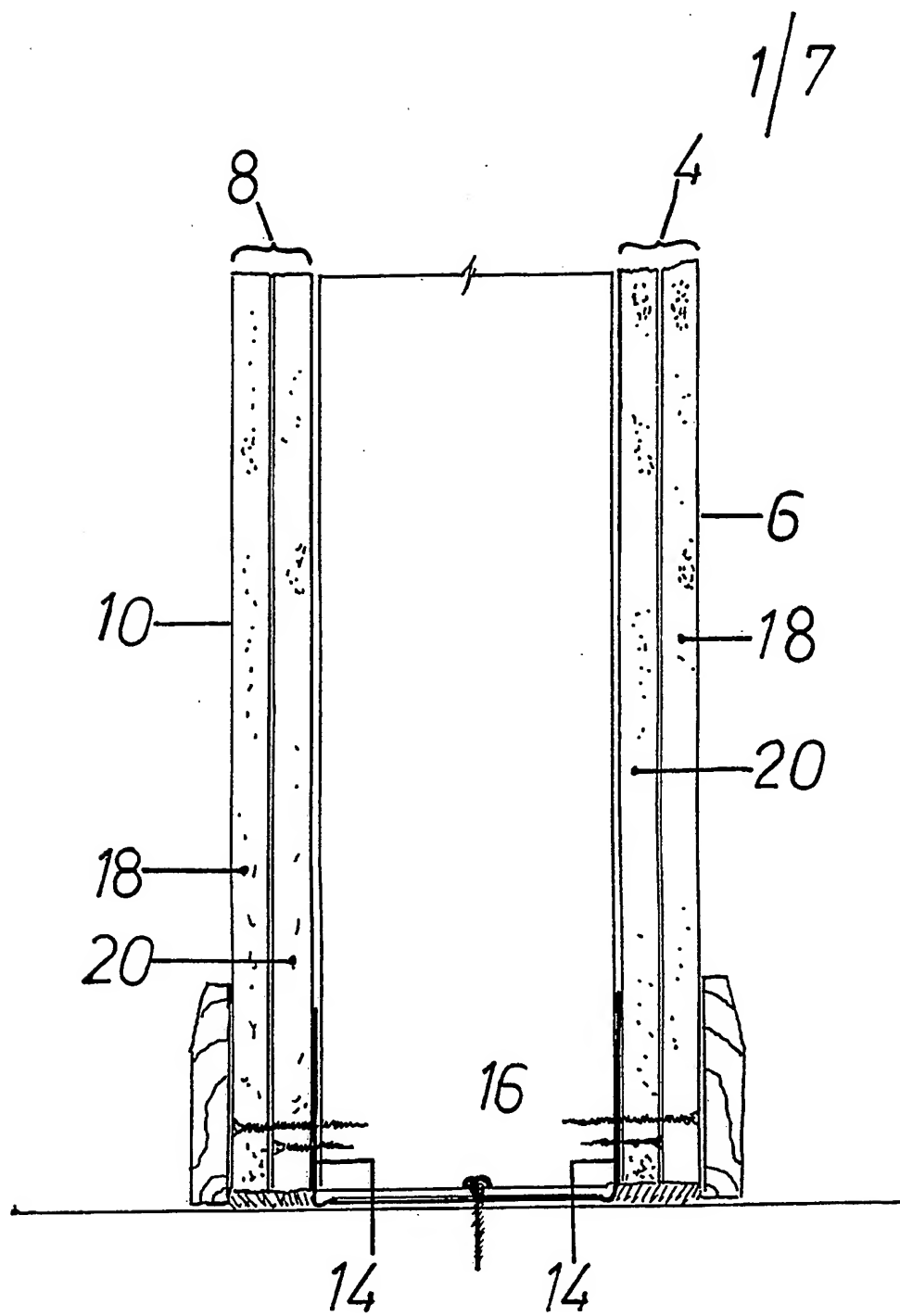


FIG 1

2/7

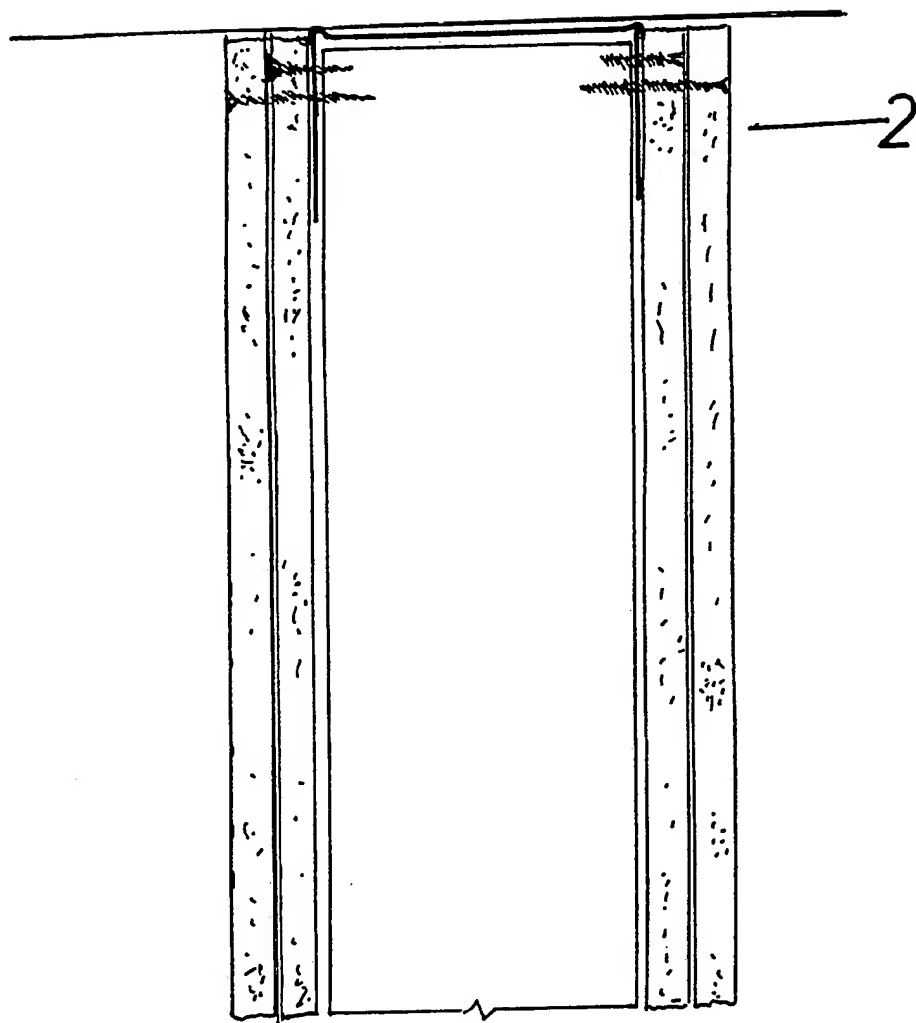


FIG 2

3/7

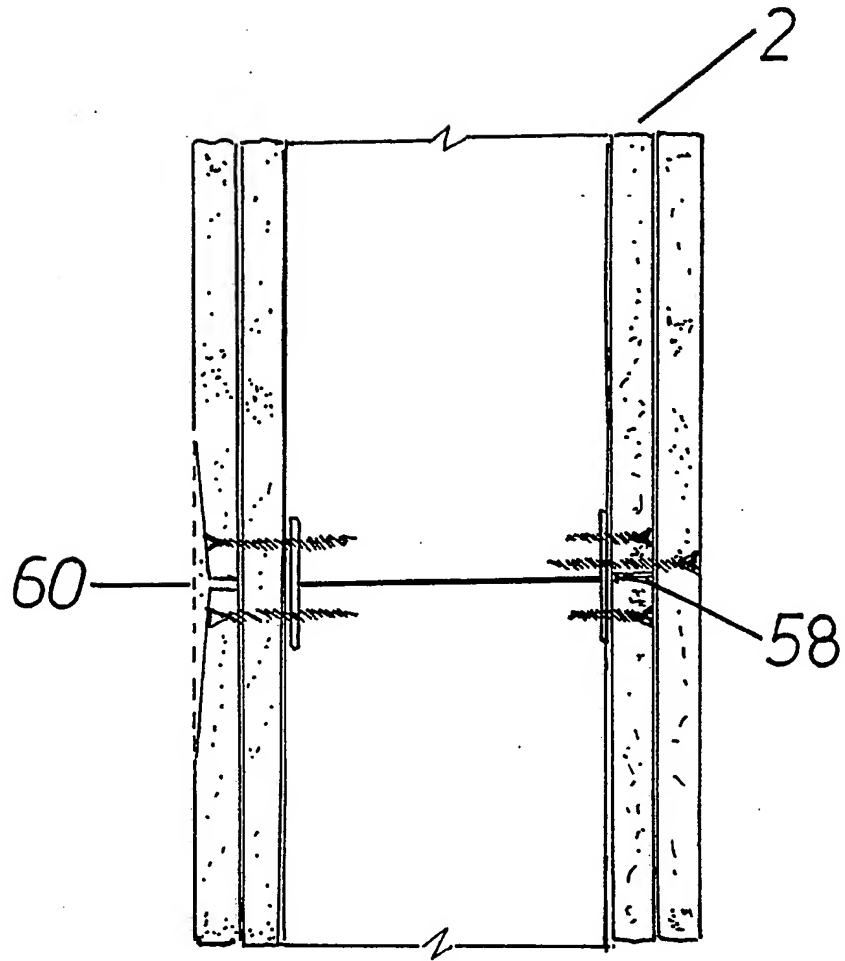


FIG 3

4/7

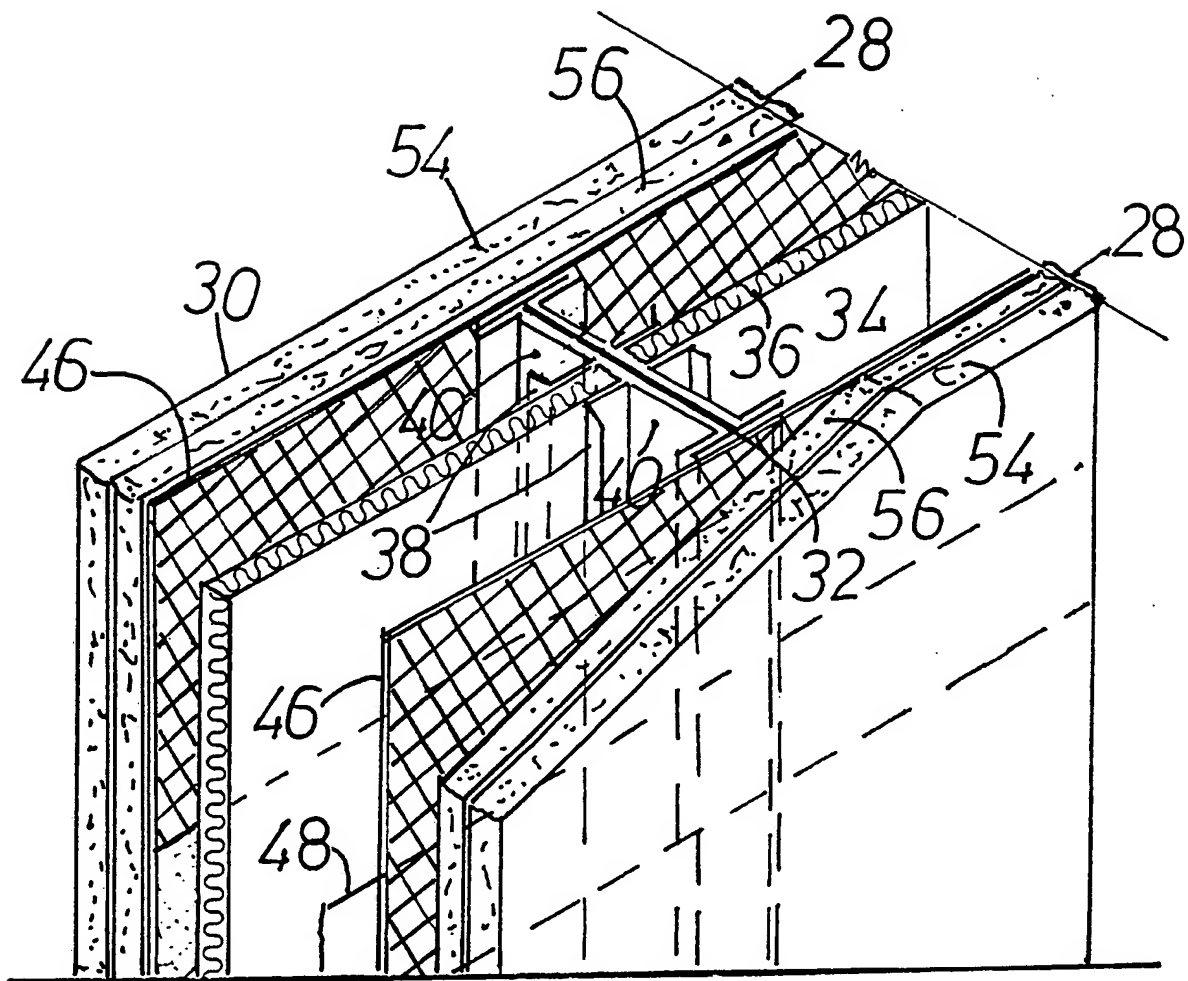


FIG 4

5/7

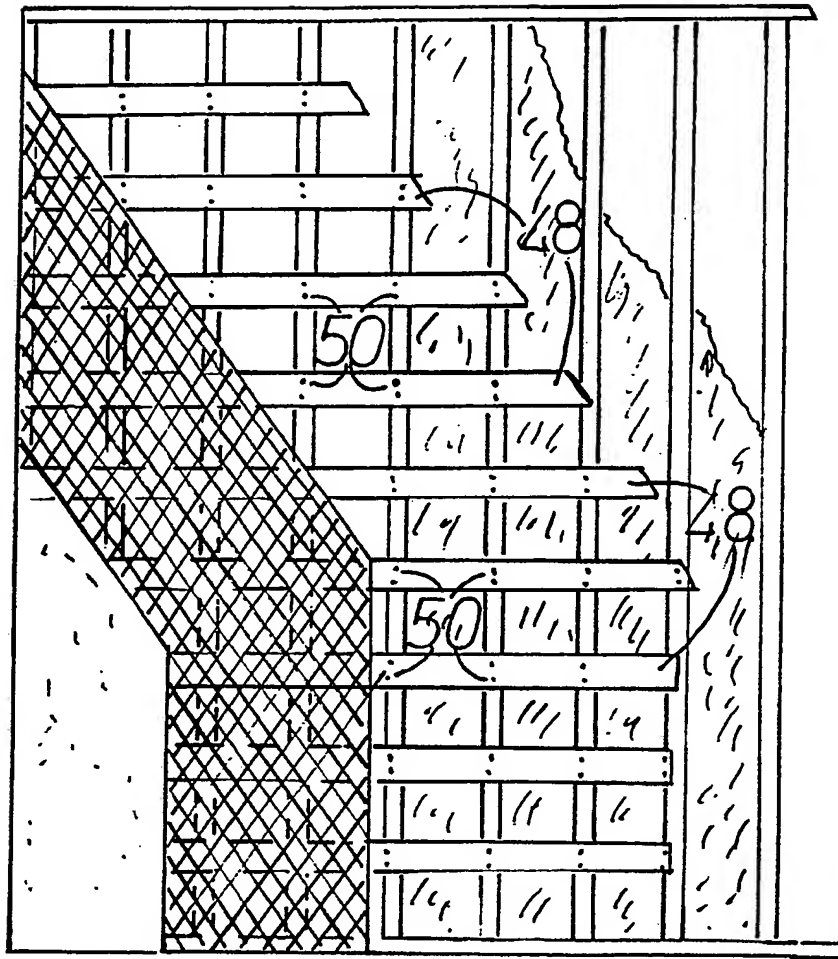


FIG 5



6/7

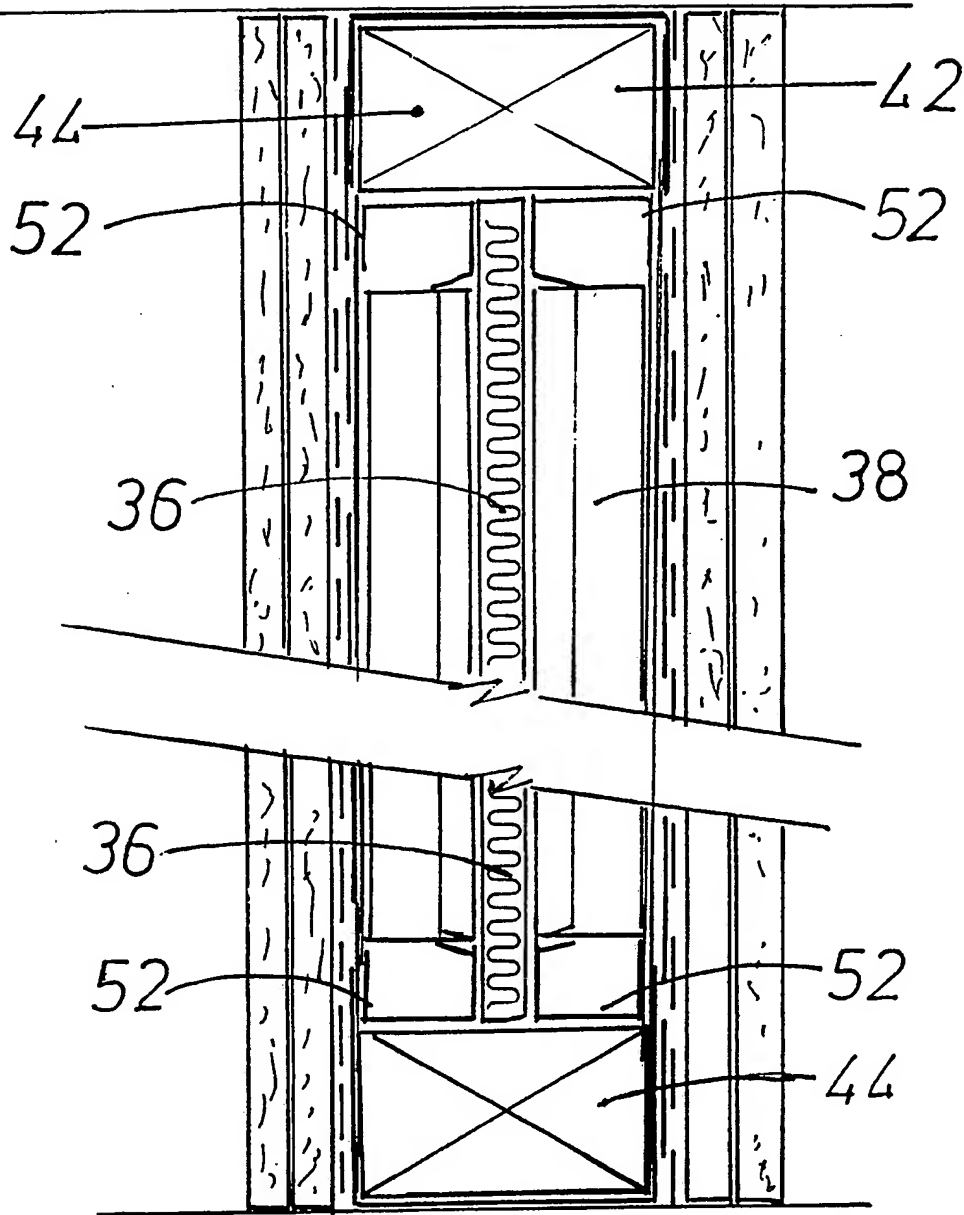


FIG 6

7/7

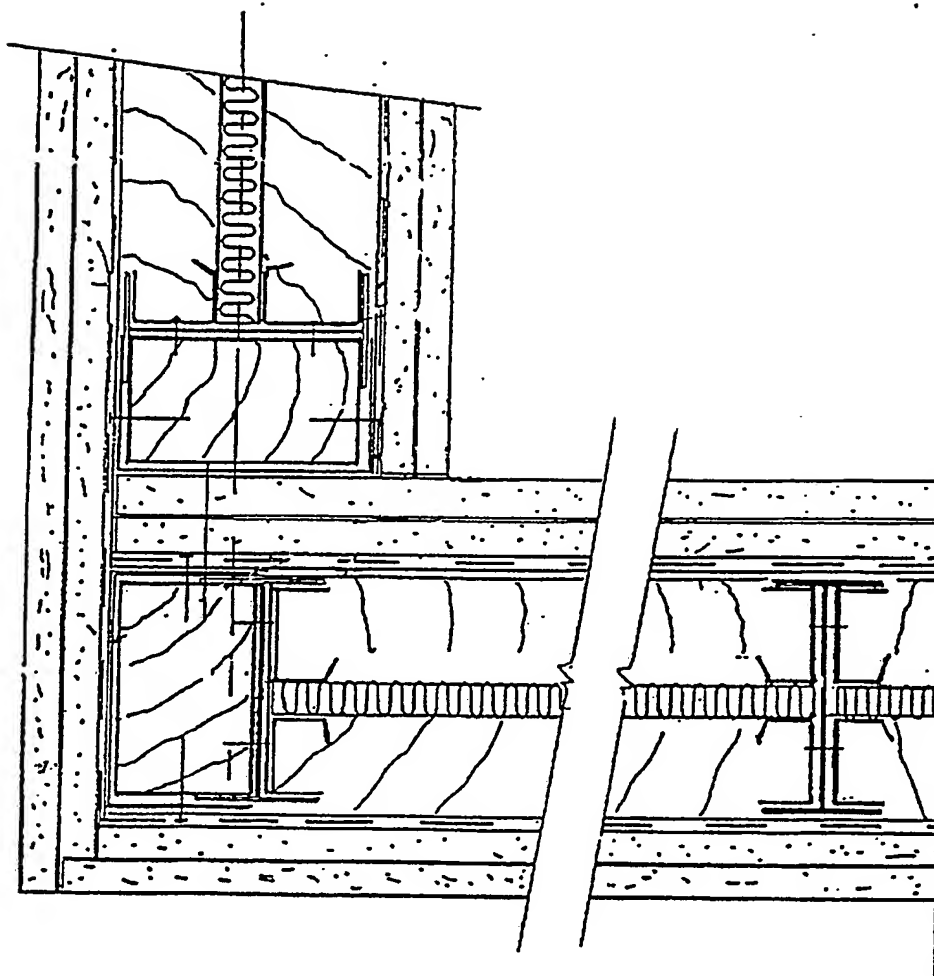


FIG 7

A STUD PARTITION

This invention relates to a stud partition.

Known stud partitions comprise a plurality of vertically extending metal stud members which are held in place by top and bottom channels. The stud members are of a C-section and they are not connected to the channels, except through screw fixings of plasterboard which are made to each side of the stud members. Bullets, shrapnel or other debris from bombs is easily able to pass from one side of the stud partition to the other without resistance. More specifically, the screws fixing the channels to the plasterboard shear through the channels, which are formed of a thin metal, and so the entire partition easily fails at low pressure.

It is an aim of the present invention to obviate or reduce the above mentioned problem.

Accordingly, in one non-limiting embodiment of the present invention there is provided a stud partition comprising first sheet material forming a first side of the partition, second sheet material forming a second side of the partition, a plurality of vertically extending stud members which are positioned between the first and the second sheet material such that the first and the second sheet material are spaced apart and define

therebetween a cavity in the partition, and third sheet material which is positioned in the cavity and which is for resisting penetration by bullets and flying debris from bombs.

Preferably, the stud members are I-shaped stud members. Other types of stud members may however be employed.

Preferably, the third sheet material is glass fibre reinforced plastics sheet material. Other types of penetration-resisting sheet material may be employed.

The partition preferably includes vertically extending channel members for securing the third sheet material to the stud members. When the stud members are I-shaped stud members, then the channel members fit in the side channels of the I-shaped stud members. There is no need for fixing bolts or screws and the channel members are able positively to secure the third sheet material to the stud members without the need for bolts or screws.

The partition preferably includes horizontally extending channel members which are positioned at top and bottom parts of the partition and which are for securing top and bottom edges of the first and the second sheet material.

Advantageously, the partition includes packing members which are positioned at the top and bottom parts

of the partition and between the stud members. The horizontally extending channel members may be secured by bolts or large screws through the packing members. The packing members are preferably made of wood but they may be made of other materials if desired. The packing members act to provide locking means for locking the stud members in position and to stop the stud members being forced out of the horizontally extending channel members under pressure, for example from a bomb blast or from the action of a bullet. The packing members also help to stop tearing of the horizontally extending channel members when they are made of thin gauge metal and when they are under stress.

Advantageously, the partition includes fourth sheet material positioned between the first sheet material and the vertically extending stud members, and between the second sheet material and the vertically extending stud members, the fourth sheet of material being a metal mesh sheet material.

Preferably, the fourth sheet material is restrained at the perimeters of the partition. This enables the fourth sheet material to form a strong flexible skin on either side of the partition, which strong flexible skin is able to resist the effects of a bomb blast since the strong flexible skin is able to stretch without breaking.

The first sheet material and the second sheet material preferably each comprise two separate sheets of material positioned one on top of each other.

The first and the second sheet material is preferably plasterboard sheet material but other sheet material may be employed such for example as laminated composite boards, plastics sheets, medium density fibre boards and compressed mineral fibre panels of fire resistant materials.

Embodiments of the invention will now be described solely by way of example and with reference to the accompanying drawings in which:

Figure 1 is a cross section through a bottom part of a known stud partition;

Figure 2 is a cross section through a top part of the known stud partition shown in Figure 1;

Figure 3 is a cross section through a middle part of the known stud partition shown in Figure 1;

Figure 4 is a perspective view, partially cut away, through a stud partition of the present invention;

Figure 5 is a front view of the stud partition shown in Figure 4 and has the various layers of the stud partition cut away for clarity of illustration;

Figure 6 is a cross section through the stud partition shown in Figures 4 and 5 and particularly

illustrates top and bottom parts of the stud partition;  
and

Figure 7 is a top sectional view illustrating how the stud partition of Figures 4 to 6 is able to be constructed to extend around a corner.

Referring to the drawings, there is shown in Figures 1, 2 and 3 a known stud partition 2 comprising first sheet material 4 forming a first side 6 of the partition 2, and second sheet material 8 forming a second side 10 of the partition 2. The sheet material 4, 8 is secured to vertically extending metal stud members 12. The stud members 12 are C-shaped in cross section. Channel members 14 are positioned at the top and bottom of the partition 2 in order to hold the stud members 12 in position. The stud members 12 are not connected to the channel members 14, except through screws 16 used to fix the sheet material 4, 6 to each other. The sheet material 4, 6 is each made of two sheets of Gypsum plasterboard 18, 20 which are positioned on top of each other as shown. Bullets, shrapnel and other debris from bomb blasts is able to pass easily from one side of the partition 2 to the other without resistance, since the screws 16 shear through the channel members 14 because the channel members 14 are only made of thin metal. The result is that the entire partition 2 fails.

Referring now to Figures 4, 5 and 6 there is shown a partition 22 in accordance with the present invention. The partition 22 has first sheet material 24 forming a first side 26 of the partition 22, and second sheet material 28 forming a second side 30 of the partition 22.

The partition 22 includes a plurality of vertically extending stud members 32. The stud members 32 are positioned between the first and the second sheet material 24, 28 such that the first and the second sheet material 24, 28 are spaced apart and define therebetween a cavity 34 in the partition 22. Third sheet material 36 is positioned in the cavity 34. The third sheet material 36 is for resisting penetration by bullets and flying debris from bombs.

The stud members 32 are I-shaped stud members. The third sheet material 36 is glass fibre reinforced plastics sheet material.

The partition 22 includes vertically extending channel members 38 for securing the third sheet material 36 to the stud members 32. As can be seen from Figure 4, the channel members 38 are substantially C-shaped in cross section and they fit in channel 40 formed by the sides of the I-shaped stud members 32 and the third sheet material 36. As can also be seen from Figure 4, the third sheet material 36 becomes sandwiched between two opposing channel members 38. Thus the third sheet



material 36 is positively secured to the stud members 32 without the need for bolts or fixing screws. The channel members 38 ensure a very firm fixing that resist against the third sheet material 36 pulling away from the stud members 32 in the event of a bomb blast or pressure from a bullet.

The partition 22 includes horizontally extending channel members 42, see Figure 5. The channel members 42 are positioned at top and bottom parts of the partition 22 and they are for securing top and bottom edges of the first and the second sheet material 24, 28.

The partition 22 includes wooden packing members 44 which are positioned at the top and bottom parts of the partition 22 and between the stud member 32. The channel members 42 are secured by bolts or large screws passing through the packing members 44. The packing members 44 act to provide a locking means for the stud members 32 to stop the stud members 32 being forced out of the horizontally extending channel members 42 under pressure. The packing members 44 also stop the tearing of the thin gauge metal of the horizontally extending channel members 42 when they are under stress.

The partition 22 includes fourth sheet material 46 positioned between the first sheet material 24 and the stud members 32, and between the second sheet material 28 and the stud members 32. As can be seen from Figures 4

and 5, the fourth sheet material 46 is a metal mesh sheet material. The fourth sheet material 46 is restrained at all perimeters of the partition 22 in order to produce a strong flexible skin which is able to resist the effects of a bomb blast since the skin is able to stretch without breaking. As can also be seen from Figures 4 and 5, the fourth sheet material 46 is positioned over longitudinally extending metal strip plates 48. The metal strip plates 48 are secured to the stud members 32 by rivets 50. Preferably, the stud members 32 are positioned at 400 or 300 mm centres apart. Short lengths of retaining channel 52 (see Figure 6) are locked into place horizontally at top and bottom portions of partition 22 so that the third sheet material 36 is held on all four sides.

The dimensions of the various channels employed in the partition 22 may vary according to the thickness of the third sheet material 36. They may also vary according to the size of the metal stud members 32 being used. They may still further vary in dependence upon the height of the partition 22.

The metal strip plates 48 are preferably 100 mm wide. The fourth sheet metal 46 is advantageously fixed to the metal strip plates 48 by binding wire at 600 mm centres.

The first sheet material 24 is made up of two sheets of plasterboard 54, 56, and the second sheet material 28 is similarly made up of two sheets of plasterboard 54, 56. This plasterboard is preferably stagger jointed and screwed to the metal stud members 32 and to the various channel sections. The plasterboard 54, 56 may be fire rated board or ordinary gypsum board. The plasterboard 54, 56 may be finished by conventional means of joint treatment and decoration and, for example, the joining of the plasterboard may be by way of a simple abutting joint as shown in Figure 3 at joint 58 or by way of a tapered joint 60 as also shown in Figure 3.

Whilst the dimensions of the stud members 32, the channel members 38 and the channel members at the top and bottom of the partition 22 may vary, the thickness preferably remains constant at 0.9 mm. The top and bottom channels are preferably extra deep channels having flanges of 70 mm. Starter channels may be employed and may vary in the web dimension but preferably remain constant in thickness of 0.9 mm with a flange length of 50 mm.

It is to be appreciated that the embodiments of the invention described above with reference to the accompanying drawings have been given by way of example only and that modifications may be effected. Thus, for example, a material other than glass fibre reinforced

plastics material may be employed for the third sheet material 36. Also, other material than plasterboard may be employed for the first and the second sheet material 24, 28. The stud partition can extend along a wall as illustrated in Figures 3 to 6 or it can be arranged to extend around corners as illustrated in Figure 7.

CLAIMS

1. A stud partition comprising first sheet material forming a first side of the partition, second sheet material forming a second side of the partition, a plurality of vertically extending stud members which are positioned between the first and the second sheet material such that the first and the second sheet material are spaced apart and define therebetween a cavity in the partition, and third sheet material which is positioned in the cavity and which is for resisting penetration by bullets and flying debris from bombs.

2. A stud partition according to claim 1 in which the stud members are I-shaped.

3. A stud partition according to claim 1 or claim 2 in which the third sheet material is a glass fibre reinforced plastics sheet material.

4. A stud partition according to any one of the preceding claims and including vertically extending channel members for securing the third sheet material to the stud members.

5. A stud partition according to any one of the preceding claims and including horizontally extending channel members which are positioned at top and bottom parts of the partition and which are for securing top and bottom edges of the first and the second sheet material.

6. A stud partition according to claim 5 and including packing members which are positioned at the top and bottom parts of the partition and between the stud members.

~~7. A stud partition according to claim 5 and claim 6 in which the horizontally extending channel members are secured by bolts or large screws to the packing members.~~

8. A stud partition according to claim 7 in which the packing members are made of wood.

9. A stud partition according to any one of the preceding claims and including fourth sheet material positioned between the first sheet material and the vertically extending stud members, and between the second sheet material and the vertically extending stud members, the fourth sheet of material being a metal mesh sheet material.

10. A stud partition according to claim 9 in which the fourth sheet material is restrained at top and bottom parts of the partition.

11. A stud partition according to claim 9 or claim 10 in which the fourth sheet material is secured to horizontally extending metal strip plates.

12. A stud partition according to any one of the preceding claims in which the first sheet material and the second sheet material each comprises two separate sheets of material positioned on top of each other.

~~13. A stud partition according to claim 12 in which the~~  
first and the second sheet material is plasterboard sheet  
material:

14. A stud partition substantially as herein described with reference to Figures 4 to 7 of the accompanying drawings.